

Chemical Emergency Medical Guideline

Information and recommendations for first responders and patients

Dimethyl sulfate

CAS No.: 77-78-1

GHS symbols:



GHS05
Corrosive



GHS06
Acute toxicity



GHS08
Health hazard

Signal word: Danger

Hazard statements:

- | | |
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| H301 | Toxic if swallowed. |
| H314 | Causes severe skin burns and serious eye damage. |
| H317 | May cause allergic skin reactions. |
| H330 | Fatal if inhaled. |
| H341 | May cause genetic defects. |
| H350 | May cause cancer. |

Overview

- There is no danger from contact with patients who have only been exposed to dimethyl sulfate vapors. However, a patient who is wet with liquid dimethyl sulfate, or whose clothing is wet with it, may endanger other people through direct contact or through evaporating dimethyl sulfate.
- Dimethyl sulfate can cause irritation to the eyes, skin and respiratory tract. Signs of fluid accumulation in the lungs (shortness of breath, blue-red discoloration of the skin and mucous membranes, sputum, coughing) may occur more than 12 hours after exposure. Skin reactions may also be delayed and heal very slowly.
- Dimethyl sulfate can also be absorbed by the body through inhalation or skin contact, causing headaches, nausea, vomiting, abdominal pain, and lung, liver and kidney damage.
- There is no known specific antidote. Treatment depends on the extent of exposure and the symptoms.

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1. Information about the substance

Dimethyl sulfate: $(\text{CH}_3)_2\text{SO}_4$, CAS 77-78-1

Synonyms: DMS, methyl sulfate, sulfuric acid dimethyl ester

Dimethyl sulfate is a colorless and odorless (slight onion smell) oily liquid with a melting point of approximately -32°C and a boiling point of 188°C . It is non-flammable and non-explosive; the flash point is 83°C and the vapor pressure is low at 65 Pa at 20°C . Dimethyl sulfate is slightly soluble in water but soluble in alcohol ethers and aromatic hydrocarbons. It hydrolyses rapidly in sulfuric acid and methanol. Dimethyl sulfate is mainly used as an intermediate for the methylation of various organic chemicals (e.g. amines, carboxylic acids, thiols and phenols) in industry and in the laboratory. It is used in the manufacture of paints, perfumes and pharmaceuticals and for the separation and analysis of mineral oils. It also has sulfating properties.

2. Exposition

2.1. Inhalation

Inhalation is a significant route of exposure to dimethyl sulfate. Dimethyl sulfate is odorless (slight onion smell) and does not provide sufficient warning of dangerous exposure.

2.2. Skin/eye contact

Dimethyl sulfate can be easily absorbed through the skin and eyes as a vapor or liquid; direct contact with dimethyl sulfate vapors or concentrated solutions can cause severe chemical burns.

2.3. Ingestion

Accidental ingestion of dimethyl sulfate is unlikely.

3. Acute health effects

Exposure to dimethyl sulfate can cause local irritation of the nose, throat and lungs.

Higher concentrations can cause fluid accumulation in the lungs with shortness of breath, blue-red discoloration of the lips, skin and mucous membranes (cyanosis), sputum and coughing with a delay of more than 12 hours after exposure.

Skin contact with dimethyl sulfate as a vapor or liquid can cause irritation with reddening of the skin, blistering, itching and pain. Skin reactions can occur with a delay of one to two hours, and it can take more than 12 hours for the full symptoms to develop. Skin injuries heal very slowly. High concentrations of vapors or splashes of concentrated solutions can cause tearing and redness of the eyes as well as damage to the cornea.

Both inhalation and skin contact can cause severe headaches, nausea, vomiting, abdominal pain, and lungs, liver and kidney damage due to the absorption of dimethyl sulfate into the body.

A single, short-term exposure to low concentrations of dimethyl sulfate, from which the affected person recovers quickly, does not normally cause delayed or lasting damage to health. After more severe exposure, symptoms may still occur after 24 hours. In some individuals, permanent breathing difficulties, repeated respiratory tract infections, liver or kidney damage may result. After prolonged exposure to high concentrations, carcinogenic effects cannot be ruled out.

4. Measures

4.1. Self-protection of first aiders

If there is a suspicion that the area the helper must enter contains dimethyl sulfate, a self-contained breathing apparatus and a chemical protection suit must be worn. Contaminated equipment should not be used. There is no danger from contact with patients who have only been exposed to dimethyl sulfate vapors. A patient who is wet with liquid dimethyl sulfate or whose clothing is wet with liquid dimethyl sulfate may endanger other people through direct contact or through dimethyl sulfate gas emissions.

4.2. Rescue

Patients should be removed from the danger zone immediately. If they are unable to walk unaided, they should be removed from the danger zone quickly using appropriate means, taking care to protect themselves. The "A, B, C procedure" has absolute priority.

- A) Clear the airways** (check for blockages caused by the tongue or foreign objects)
- B) Ventilation** (check the patient's breathing, if necessary, begin ventilation with adequate self-protection, e.g. breathing mask)
- C) Circulation** (begin resuscitation on any person who does not respond to verbal commands and is not breathing normally)

4.3. Cleaning

Patients who have been exposed to dimethyl sulfate vapors or liquid require cleansing measures even if there are no signs of skin or eye irritation. If possible, patients should assist in their own cleansing. If liquid dimethyl sulfate has been exposed and clothing is contaminated, it must be removed and securely wrapped.

Rinse affected skin and hair with water for at least 15 minutes. Protect eyes while rinsing. Continue other important supportive measures during this time.

If the eyes have been exposed to dimethyl sulfate or if there is eye irritation, rinse with water or neutral saline solution for 15 minutes. Remove any contact lenses, if possible, without causing further irritation to the eyes. Continue other important first aid measures during this time.

4.4. Further measures

Any person who may have been exposed to dimethyl sulfate should seek medical attention immediately.

4.5. Instructions for further rules of conduct

Consult your family doctor or the emergency department of the nearest hospital if any abnormalities or symptoms occur within the next 24 hours, especially:

- Coughing, wheezing or whistling when breathing
- Difficulty breathing or shortness of breath
- Increased pain, itching or abnormalities in the affected skin areas or eyes
- Blistering of the skin
- Stomach pain, vomiting, diarrhoea

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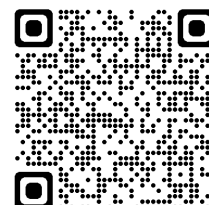
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BASF has taken every possible care to ensure that the information presented in this document is accurate and up to date but does not claim that this document comprehensively covers all possible situations in this regard. This document is intended as an additional source of information for doctors in hospitals and is designed to assist in the assessment of the condition and treatment of patients exposed to dimethyl sulfate. However, it does not replace the professional assessment of the respective situation by physicians in hospitals and must be interpreted in accordance with legal regulations and provisions as well as specific information available about the respective patients.